



Marshall, V., Jaffee, A., Leary, S. D., Ness, A., Masters, N., Birch, L., England, C., Lithander, F. E., Atkinson, C., & Shield, J. P. (2019). What do families know about healthy eating and physical activity? A lesson from Wallace and Gromit. *Archives of Disease in Childhood*. <https://doi.org/10.1136/archdischild-2019-318550>

Peer reviewed version

Link to published version (if available):  
[10.1136/archdischild-2019-318550](https://doi.org/10.1136/archdischild-2019-318550)

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## **What do families know about healthy eating and physical activity: a lesson from Wallace and Gromit.**

Marshall, V\*; Jaffee A\*, Leary SD\*, Ness AR\*, Masters N<sup>^</sup>, Birch L\*, England C\*, Lithannder FE, Atkinson C\*, Hamilton-Shield JP\*.

\*Bristol NIHR Biomedical Research Centre (Nutrition theme): University Hospitals NHS Foundation Trust and University of Bristol, Upper Maudlin Street, Bristol, BS2 8AE.

+ Bristol Medical School, 4<sup>th</sup> year student, University of Bristol.

<sup>^</sup> Director, Wallace & Gromit's Grand Appeal, 30-32 Upper Maudlin Street, Bristol BS2 8DJ.

Corresponding author: V Marshall: [vanessa.marshall@bristol.ac.uk](mailto:vanessa.marshall@bristol.ac.uk)

In 2018, The Grand Appeal organised a fundraising event for Bristol Royal Hospital for Children entitled "Gromit Unleashed 2." In partnership with Aardman Animations, this sculpture trail featured 67 giant sculptures of the characters Wallace, Gromit and Feathers McGraw, located in high footfall and iconic locations around Bristol and surrounding areas. The trail featured a "healthy eating hero" sculpture named Banana-arm-a that linked to a short digital quiz. In collaboration with the NIHR Bristol NIHR Biomedical Research Centre, Nutrition theme, a ten question "Healthy Living Quiz" was developed to test Bristol general public's knowledge on healthy living for children in a fun based survey (Table 1). Questions were short, child focussed and based upon practical food knowledge and key health recommendations. This was available to complete online and on Gromit Unleashed 2's "Detect-O-Gromit 2" app. Data were captured from 2nd July until 7th October 2018. The quiz also gathered basic demographic data and consent.

In total 5379 individuals answered all the questions in the quiz (22.3% male). 9.4% of respondents were aged 18 years or under. The median (inter-quartile range-IQR) number of correct answers was 7(5, 8) but only 139 of 5379 (2.6%) respondents achieved full marks. Sex was important, with females answering more questions correctly than males (median (IQR) 7(6,8) vs 6(5,7),  $p<0.001$ ). There was only weak statistical evidence of a difference for those aged 18 years or under vs over 18s (6(5,8) vs 7(6,8),  $p=0.05$ ).

The quiz provided the correct answers once completed for educational value. This is important as there appear to be gaps in the general public's knowledge on key issues such as the levels of sugar in soft drinks, the salt requirements for children, what fish can be defined as oily and the amount of physical activity that children should do each day (1). In our survey, the estimated daily requirement for salt was under-estimated in more than 50% suggesting that the public is aware of the general message on salt intake reduction but uncertain of age banded requirements. Furthermore, there is still considerable ignorance of recommendations on childhood physical activity although 60.1% of those aged 18 years or under vs 46.7% of those over 18 answered the physical activity question correctly ( $p<0.001$ ; Table 2). Sugar excess in soft drinks is still widely under-estimated. The difference between sexes (Table 2) in terms of food knowledge is perhaps unsurprising as similar differences in attitudes and knowledge have been described before. In a previous study more than 60% of females said they 'Knew which foods to select in order to follow the dietary recommendations aimed at improving the health of the Nation' compared with less than 40% of males (2). In conclusion, some messages on food choices for health are well known amongst the population, Calcium for healthy bones being almost universally known, but significant gaps still exist for public policy attention.

**Table 1 shows the category percentages for each of the ten questions, and the ranking of questions based on the percentage of correct answers (N=5379)**

Question	Answers			Rank based on % correct
What helps keep your bones strong?	<b>Calcium</b> 99.1%	Salt 0.2%	Fibre 0.7%	1
Potatoes belong to which category?	Fruits/veg 11.5%	Foods high in fats/sugar/salt 0.8%	<b>Starchy foods</b> 87.7%	2
Which of the following is a dairy food?	Eggs 14.0%	<b>Yoghurt</b> 86.0%	Beef 0.0%	3
Frozen fruits and vegetables:	Have more sugar than fresh 4.5%	Have less vitamins than fresh 19.0%	<b>Are just as healthy as fresh</b> 76.5%	4
How many cubes of sugar can be found in a standard can of cola?	4 cubes 3.9%	6 cubes 30.8%	<b>9 cubes</b> 65.3%	5
Which of these is an oily fish?	<b>Salmon</b> 60.0%	Tinned tuna 34.0%	Cod 6.0%	6
Baked beans belong to which food group?	Fruits/veg 4.3%	Protein foods 42.5%	<b>Both</b> 53.2%	7
How many minutes of physical activity/day do children need to stay healthy?	<b>60 mins</b> 48.0%	30 mins 47.0%	10 mins 5.0%	8
How much salt is the maximum recommended for a five- year old per day?	1g 51.3%	<b>3g</b> 43.6%	6g 5.1%	9
The main fuel we need to keep our brains working is:	Fat 9.0%	Protein 57.0%	<b>Carbohydrate</b> 34.0%	10

Footnote: Answers marked with bold are correct

**Table 2 shows how percentage correct answers varied by age and sex.**

Question	Age			Gender		
	≤18 years % correct (N=499)	19+ years % correct (N=4805)	P*	Male % correct (N=1183)	Female % correct (N=4115)	P*
What helps keep your bones strong?	95.8	99.5	0.001	98.0	100.0	<0.001
Potatoes belong to which category?	74.6	89.2	<0.001	81.8	89.5	<0.001
Which of the following is a dairy food?	90.0	85.3	<0.01	83.0	86.5	0.003
Frozen fruits and vegetables:	60.3	78.2	<0.001	64.4	79.9	<0.001
How many cubes of sugar can be found in a standard can of cola?	62.9	65.5	0.3	64.2	65.5	0.4
Which of these is an oily fish?	50.1	60.9	<0.001	53.1	61.7	<0.001
Baked beans belong to which food group?	44.1	54.3	<0.001	51.9	53.7	0.3
How many minutes of physical activity/day do children need to stay healthy?	60.1	46.7	<0.001	46.6	48.0	0.3
How much salt is the maximum recommended for a five- year old per day?	57.5	42.3	<0.001	48.6	42.3	<0.001
The main fuel we need to keep our brains working is:	43.3	33.3	<0.001	40.6	32.5	<0.001

\*Chi-squared tests for comparison between age and sex groups

(1) UK Chief Medical Officers' Physical Activity Guidelines.

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- (2) Women, men and food: the significance of gender for nutritional attitudes and choices. Alan Beardsworth. British Food Journal 104(7):470. Emerald 2002.0007-070X

Acknowledgments: This study was supported by the NIHR Biomedical Research Centre at University Hospitals Bristol NHS Foundation Trust and the University of Bristol. The views expressed in this publication are those of the authors and not necessarily those of the NHS, the National Institute for Health Research or the Department of Health and Social Care.